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Montana's Log Home Industry: Development and Current Status

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RESEARCH SUMMARY

The authors examine the development and current structure of the Montana log home industry, with emphasis on raw material requirements, market areas, and employment. Montana's log home industry ranks among the largest in the United States and is substantially larger than the log home industry in any of the other Western States.

Prior to the early 1970's, there were fewer than six log home manufacturers operating in Montana. Annual production was from 500,000 to 1 million lineal feet, with a sales value of about \$3 million (1988 dollars). In 1988, there were 35 log home manufacturers operating in Montana, producing 5.5 million lineal feet of house logs, for sales of about \$30 million.

The markets for Montana's house logs and log homes have expanded from a few States to the entire Nation and foreign countries. In 1976, 23 percent of the \$13.4 million in sales were to Montana customers, 37 percent were to other Rocky Mountain States, 20 percent were to the West Coast, and 20 percent were to other U.S. destinations. In 1988, only 13 percent of the \$30 million in sales went to Montana, 19 percent to other Rocky Mountain States, 15 percent to the West Coast, 46 percent to other U.S. destinations, and 7 percent to foreign countries.

Montana's log home industry processed 20 million board feet of timber in 1988. Dead lodgepole pine has been the mainstay of Montana's log home industry, accounting for 64 percent of the 1988 volume processed. Other major species include Douglas-fir (13 percent), Engelmann spruce (12 percent), and western redcedar (6 percent).

The log home industry requires a relatively specialized timber product for a house log and pays a premium for that product. In June 1989, the spot market for green lodgepole sawlogs delivered to sawmills was about \$180 per thousand board feet as opposed to over \$250 per thousand board feet paid by house log manufacturers for dead lodgepole pine.

Montana's log home industry employs 15 to 35 workers per million board feet of timber processed in comparison to the sawmill and plywood industries which employ only three to five workers per million board feet of timber processed. Average annual wages of full-time workers in the log home industry are 20 to 40 percent lower than the sawmill and plywood industry.

The high value of timber suitable for house logs and the high level of employment associated with a given volume of timber processed by the log home industry suggest that land managers should consider developing timber sales specifically for house log material whenever possible. Because house logs must meet special requirements, a large-scale timber sale program directed at the log home industry may be difficult to implement.

Montana's Log Home Industry: Development and Current Status

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INTRODUCTION

Shelters constructed of logs have been used in Montana since European man arrived. With the arrival of the first white settlers early in the nineteenth century, the log home became a common dwelling in the State. During the late nineteenth and early twentieth centuries, the log home industry, if it could be called an industry, was one serving the housing needs of the local population and, in fact, the occupants usually built their own homes.

Today Montana's log home industry ranks among the largest in the United States, is substantially larger than the log home industry in any of the other Western States, and produces homes not only to serve local populations but for sale in national and international markets (Home Buyer Publications, Inc. 1989). Although the log home industry remains relatively modest in the State, it has grown tremendously in the last two decades, offering a high-value market for the right kind of timber, and generating high levels of employment per unit volume of timber processed.

In this report, the authors examine the current structure and development of the Montana log home industry, with an emphasis on the last 15 years. Attention is given to its raw material requirements, market areas, and employment.

METHODS

Detailed annual information similar to that available on the operations of the major sectors of the primary forest products industry—such as the lumber and plywood producers—is not readily available for the log home industry. For this reason, this report draws heavily on periodic censuses of Montana timber processors done in 1976, 1981, and 1988 (University of Montana, FIDACS). The census is a cooperative effort involving the University of Montana, Bureau of Business and Economic Research, and the U.S. Forest Service, Intermountain Research Station, and is the basis

of the Forest Industries Data Collection System (FIDACS), specifically designed to develop information for a given State on:

- The numbers and types of timber products processors
- Plant production capacity
- Production employment
- The volume of timber received from geographic and ownership sources
- The species of timber received
- The volume, type, sales value, and market location of finished products manufactured from that timber
- The utilization and marketing of manufacturing residue
- Plant production equipment
- The beginning and ending inventory levels for raw materials and finished products

The first year of the census in Montana, 1976, followed a period of rapid growth in the State's log home industry. The second year, 1981, was a year of weak wood products markets, which lowered sales and production in Montana's log home industry. The year 1988 offers a look at a more developed and sophisticated industry operating under improved market conditions. The most apparent development in the late 1980's was the dramatic increase in sales outside the United States.

DISCUSSION

Development of Montana's Industry

Before 1976, there is virtually no detailed information on Montana's log home industry operations. Industry directories published prior to that time indicate that there were fewer than six log home or house log manufacturers (Montana Department of Natural Resources 1969, 1973; Montana Extension Service 1960). Discussions with representatives of a number of the plants listed in

Table 1—Number of log home manufacturers, production, and sales in Montana, 1960-88

Year	Manufacturers	Production	Sales ¹	
			Current dollars	1988 dollars
	<i>Number</i>	<i>Thousand lineal ft</i>	<i>----- Thousands -----</i>	
1960	3-5	500-1,000	600	3,000
1969	5	500-1,000	1,150	3,000
1972	5	500-1,000	1,500	3,000
1976	19	3,000	6,950	13,400
1981	27	4,000	10,400	13,500
1988	35	5,500	30,000	30,000

¹FOB plant.

directories from the early 1970's, the largest of which are still operating, allowed us to develop a general picture of the log home industry prior to 1976.

Prior to 1957, there was only one sizable plant operating in Montana. This was the National Log Construction Company plant, built in 1919 and still operating today. In 1957, Lumber Enterprises, also still operating, established a log home plant in Gallatin Gateway, and these two facilities accounted for the bulk of Montana's output until the 1970's.

In the 1960's, there were three to five log home producers in Montana (table 1), but the industry had little growth during that period (Montana Department of Natural Resources 1969, 1973; Montana Extension Service 1960).

Based on discussions with people in the industry and on the forest industry directories, the industry produced between 500,000 and 1 million lineal feet of house logs annually during the 1960's, compared to 5.5 million lineal feet produced in 1988. The annual sales value was approximately \$3 million per year during the 1960's, compared with \$30 million per year in 1988 (both figures are 1988 dollars). Most of the house logs were sold in the form of log home kits. The 1976, 1981, and 1988 sales value figures are from the census of the industry done by the Bureau of Business and Economic Research. The 1988 figure differs somewhat from the estimate published by Home Buyer, Inc., which indicated \$37 million in 1988. The authors believe the sales value figure from the census is the most accurate estimate.

In the early 1970's there was a dramatic increase in the number of plants, output, and sales. By 1976, the number of plants producing log homes had nearly quadrupled to 19, production of house logs was at 3 million lineal feet, and industry sales were

about \$13.4 million (1988 dollars) (University of Montana, FIDACS).

The industry increased further during the late 1970's, producing a larger volume of house logs, and in 1981 there were 27 plants producing 4 million lineal feet of house logs (University of Montana, FIDACS). Although the number of plants and house logs increased in 1981, sales, in constant 1988 dollars, remained about the same as in 1976—about \$13.5 million. The low increase in sales is probably due to the low construction activity and low wood product prices that prevailed nationally in 1981.

Since 1981, substantial growth has occurred in Montana's log home industry. By 1988 the number of producers had increased to 35, sales were \$30 million, and output was 5.5 million lineal feet of house logs, most of which were sold as predesigned home shells or complete homes (University of Montana, FIDACS).

Current Structure of Montana's Log Home Industry

Three types of house logs are produced in Montana—hand-hewn, machine-planed or machine-lathed, and sawn.

The hand-hewn logs, also referred to as authentic style, are generally peeled by hand with a draw knife, and may be notched and grooved with an axe, a chisel, and a chainsaw. Machined logs are either planed or turned on a lathe to a standard diameter and then notched and grooved by machine. Sawn house logs are squared on two or three sides with a saw and left round on the remaining surface(s).

In 1988, approximately 48 percent of the volume of logs produced were hand hewn, 48 percent were machine processed, and 4 percent were sawn (University of Montana, FIDACS).

Markets

Markets for Montana's log homes have changed substantially since 1976, expanding from a few States to the entire Nation and foreign countries. In 1976, 23 percent of the \$13.4 million sales of Montana's log home industry were to Montana customers, with 37 percent of the sales to other Rocky Mountain States, including Arizona, Colorado, Idaho, Nevada, New Mexico, Utah, and Wyoming (table 2) (University of Montana, FIDACS). Another 20 percent of the sales were in the far western States including California, Oregon, and Washington. The remaining 20 percent of the sales were to other parts of the United States, primarily the Midwest and the South. In 1976, no Montana mills reported log home sales to consumers in other countries.

By 1981, Montana's log home industry had clearly become one dealing in markets throughout the United States. During 1981, only 16 percent of the industry's \$13.5 million in sales were to Montana consumers; 24 percent were to other Rocky Mountain States; and 21 percent to far western States (University of Montana, FIDACS). Sales to other U.S. destinations increased from 20 percent in 1976 to 38 percent in 1981. Shipments to purchasers in other countries accounted for 1 percent of sales in 1981.

The major change from 1981 to 1988 has been the continuing development of markets outside Montana, with a dramatic increase in log home sales to other countries. Of the total sales in 1988, only 13 percent were to Montana customers. Montana producers' sales to customers outside the United States increased from 1 percent of total sales in 1981 to 7 percent in 1988.

Montana producers' proportion of sales in the other Rocky Mountain States has continued to decline during the 1980's, from 24 percent in 1981

to 19 percent in 1988 (University of Montana, FIDACS). One factor contributing to the declining sales proportion in that region may be the Rocky Mountain area's poor economic performance during the 1980's.

Raw Material Use and Needs

In 1988, Montana's log home industry processed approximately 20 million board feet (Scribner) of timber, a relatively small amount in comparison to the sawmills and plywood plants, which processed approximately 1.2 billion board feet that year (University of Montana, FIDACS). Nevertheless, the high price paid for suitable timber makes the industry more worthy of note than the modest volumes processed might indicate.

The log home industry requires a relatively specialized timber product for a house log. Timber normally processed at sawmills and plywood plants may not be suitable for house logs, which can accommodate considerable checking but generally have stringent restrictions on the amount of crook or sweep—abrupt bends or curves in the logs (Moore 1988). The high price paid for timber by the log home industry indicates that suitable timber for house logs is in short supply.

To illustrate, the mainstay of Montana's house log industry has been dead lodgepole pine (*Pinus contorta*). The industry provides a premium market for "the right kind" of dead lodgepole pine. In June 1989, the spot market price for green lodgepole pine sawlogs delivered to Montana sawmills was about \$180 per thousand board feet (Scribner). In contrast, dead lodgepole pine timber suitable for house logs was over \$250 per thousand board feet (University of Montana, PRICE).

Changes in Species Use—Lodgepole pine has been the most commonly used and preferred species because the bole is straight with little sweep or taper. Lodgepole is generally found in sizes from 9 to 14 inches diameter at breast height—a good size for constructing log homes. Further, standing dead lodgepole pine dries with little rot and defect in the cool, dry climate of the Northern Rocky Mountain region.

Industry expansion and diversification, the production of homes using larger logs, and apparent limited availability of the right kind of lodgepole pine has led to increased use of species other than lodgepole, as illustrated in table 3 (University of Montana, FIDACS). The house log plants operating in the State before 1970 processed primarily lodgepole pine and, in 1976, standing dead lodgepole accounted for more than 94 percent of the timber used by the industry.

Table 2—Sales destination of Montana log homes

Region	Total sales		
	1976	1981	1988
	----- Percent -----		
Montana	23	16	13
Other Rocky Mountain States ¹	37	24	19
Far western States ²	20	21	15
Other U.S. destinations	20	38	46
Export	—	1	7

¹Other Rocky Mountain States include Arizona, Colorado, Idaho, Nevada, New Mexico, Utah, and Wyoming.

²Far western States include California, Oregon, and Washington.

Table 3—Volume of timber used by Montana house log producers by species

Year	Species								Total
	Lodgepole pine	Douglas-fir	Ponderosa pine	Western white pine	Western larch	Western redcedar	Subalpine fir	Engelmann spruce	
	----- Thousand board feet (Scribner rule) -----								
1976	10,100	125	—	135	60	—	10	230	10,660
1981	8,435	1,305	1,155	455	1,210	240	480	315	13,595
1988	12,965	2,650	175	275	380	1,200	—	2,490	20,135

In 1981 and 1988, lodgepole pine accounted for 62 percent and 64 percent, respectively, of the timber used by Montana's log home industry. As indicated in table 3, Douglas-fir (*Pseudotsuga menziesii*), western larch (*Larix occidentalis*), western redcedar (*Thuja plicata*), and Engelmann spruce (*Picea engelmannii*), combined with lodgepole pine, accounted for more than 95 percent of the timber processed into house logs in Montana in 1988.

Degree of Processing and Employment

In addition to premium prices paid for delivered logs, two related factors make Montana's log home industry more important than processed volumes might indicate. These are the degree of processing which takes place in the State and the high degree of employment associated with a given volume of timber processed.

Most of Montana's wood products industry processes timber directly into primary products, such as lumber, which are then shipped out of the State for construction or further use by manufacturers. For example, more than 85 percent of the lumber and plywood produced in the State is shipped elsewhere for further processing or use (University of Montana, FIDACS).

In contrast, virtually all house logs manufactured in Montana in 1988 were further processed within the State into predesigned home shells or complete homes. The shells or complete log homes were then shipped to their destination for construction. There are very few mills that process timber only to the house log stage, and virtually all of these sell the manufactured logs to log home plants in the State.

This additional manufacturing of the primary wood product, coupled with the fact that a number of the mills produce hand-crafted homes, makes the log home industry very labor intensive in comparison with sawmills and plywood plants.

Hand-crafted manufacturers in Montana, for example, employ more than 20 production workers

annually per million board feet (Scribner) of timber processed, with an additional five to 15 workers in design, administration, and sales—for a total of about 30 full-time equivalent workers per million board feet of timber processed, according to various plant managers and the industry census done by the Bureau of Business and Economic Research. The machined-log producers generally employ 10 to 20 production workers annually per million board feet (Scribner) of logs processed, with an additional five to 15 workers in design, administration, and sales—about 15 to 35 workers annually per million board feet. The sawmill and plywood industry in the region, on the other hand, employs only three to five workers annually per million board feet of timber processed (Keegan and others 1990). The average annual wages of full-time workers in the log home industry is 20 to 40 percent lower than the sawmill and plywood industry.

CONCLUSIONS

The Outlook

During the 1970's there was explosive growth in the number of log homes constructed in the United States and, correspondingly, in the number of log home companies. The increases in log home companies and the number of units they produced slowed somewhat in the 1980's, and the industry now appears at a stage where it is beginning to mature. At early maturity of an industry, growth declines, fewer new companies enter the industry, and established competitors begin to dominate the market. All of these appear to be occurring in Montana's log home industry.

Despite the onset of maturity, there still should be substantial potential for growth left in the log home industry. Overall sales in the last few years have steadily increased, although not at the rate previously experienced. The industry should enjoy continued growth because certain obstacles have been eliminated—lack of financing, lack of building

codes, a dearth of architects who understand log construction, etc. Log homes are not a passing fad. Their underlying quality has been proven. Therefore, based on the industry's apparent stage of evolution, one can expect to see consistent growth somewhat higher than the overall national home-building rate in the next decade.

From a market standpoint, Montana's log home industry looks healthy. Not only does the national market look good, but some of the country's largest and most reputable producers are in the State.

The biggest problem producers face is the current shortage of timber. It is not clear if this will be a long-term or temporary complication, but plans by one of the State's largest log home facilities to build a manufacturing plant in British Columbia, closer to its major raw material source, is a sign worthy of concern.

Some Implications for Land Managers

The high value of timber suitable for house logs and the high level of employment associated with the log home industry suggest land managers might want to develop sales of timber for house log material whenever possible. This may be easier said than done in many cases, because only a small portion of a timber stand, live or dead, is suitable for house logs. There is no information available on timber resources suitable for house logs. Given that virtually every log home manufacturer contacted indicated that raw material supply was a major constraint on their operation, and that the log home industry will pay a substantial premium for timber, it appears that the proportion of suitable material in a typical stand of timber is relatively low. Less than 2 percent of the sawtimber-size material harvested in 1988 in Montana was processed into house logs, despite the fact that the industry pays more than 40 percent more per thousand board feet for timber than do sawmills.

Because a small percentage of a timber stand is suitable for house logs, it may be difficult for land managers to "produce" house logs except in conjunction with the harvest of sawtimber. The results of the Bureau's 1988 census indicate a substantial degree of integration in raw material procurement between the sawmill industry and the log home industry. Log home manufacturers were asked the ownership and geographic source of the timber they processed. The manufacturers had

difficulty responding to this question because they purchased more than 25 percent of their timber directly from sawmills. The house logs had been delivered to sawmills that sorted the timber and sold suitable logs to house log plants. These census figures understate the reliance on the sawtimber harvest to produce house logs because house log plants indicated purchasing logs from sawmills only when they could not identify the original ownership or geographic source of the timber.

Land managers and owners certainly should be aware of the exceptional value of timber suitable for the log home industry. But it is unlikely that timber stands could be managed to produce house logs as the primary timber product on a large scale. An intensive, small-scale program may be justified in some areas.

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Montana's log home industry is among the largest in the United States and substantially larger than the log home industry in any of the other Western States. The log home industry has grown from fewer than six producers with sales of \$3 million (1988 dollars) prior to the early 1970's to 35 producers with sales of \$30 million in 1988. House log manufacturers pay a substantial premium above what sawmills pay for similar logs. Montana's log home industry employs 15 to 35 workers per million board feet of timber processed, whereas the sawmill and plywood industries employ three to five workers per million board feet of timber processed.

KEYWORDS: timber products, employment, lodgepole pine, house logs

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